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Notes on North American Enodias (Lepidoptera)

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The genus *Enodia* was erected by Hübner in 1818 in his "Verzeichnis Bekannter Schmettlinge," page 61, in which he included three species: *andromacha, dejeanira* and *hyperanthe*. Scudder, in 1872 in the Fourth Annual Report of the Peabody Academy of Science, selected *Enodia andromacha* Hübner as the genotype. *Andromacha* Hübner, 1818 is a synonym of *Papilio portlandia* Fabricius, 1781. On page 56 of the above work, Hübner proposed the generic name *Lethe,* citing only one species *Papilio europa* which becomes the genotype by monotypy. Scudder, in 1875 in the Bull. Buff. Soc. Nat. Sci., vol. II, p. 242, erected the genus *Satyrodes* with *Papilio eurydice* Linnaeus-Johanssen as the genotype.

The various members of the above genera will vary with regard to the shape of the wings, the presence and character of androconial patches, shape of the hindwing, and in maculation. However, none of these characters are limited to any one genus, thereby being generically diagnostic. Careful venational studies have not revealed any differences of generic rank. In all three of the genotypes, the primaries are almost identical: the subcostal is swollen at the base; the cell is half the length of the wing and broad; R_1 and R_2 arise before the end of the cell and extend to the costal margin; R_{3-5} originates at the end of the cell with R_3 intersecting the costal margin, R_4 the apex, and R_5 the outer margin; the upper discocellular is short and straight, the middle is curved basally, the lower is straight, over twice as long as the middle and meeting M_3 beyond its intersection with Cu_1. The venations of the secondaries of the three genotypes are also identical except for the following characters: the cell is closed in

europa, open in *eurydice*, and closed by a very thin vein in *portlandia;* the humeral vein in *europa* is curved, in *portlandia* is short and angled, and in *eurydice* is very short and clubbed at the end. The rounded wing form of *eurydice* is also found in such species of *Lethe* as *epimenides* and *marginalis,* which, however, lack the distinctive form of valve of the former.

In genitalic studies of the three genotypes, the basic structures were identical. *Europa* is distinctive because it lacks the pair of socii at the base of the uncus. The valves of *portlandia* and *europa* are both long, narrowed distally, broader basally; the valves of *eurydice* are proportionally shorter, broader, with a distinctive rounded appendage at the distal end. None of the differences observed were, in my opinion, of generic rank, although the absence of the socii in *europa* along with the differences in venation are probably deserving of subgeneric distinction.

The author proposes, therefore, that *Lethe,* which has page priority over *Enodia,* be retained as the generic name applying to the entire group; and also as a subgeneric name to include *europa* and its relatives. *Enodia* Hübner may be used as a subgeneric name to include the North American representatives of the genus along with a large percentage of old world members such as *titania, marginalis* and *kansa* which agree with *portlandia* in genitalic and venational structure. *Satyrodes* Scudder is to be considered as a synonym of *Enodia,* having no characters of sufficient value to separate it from that genus. The generic names *Orcas* Hübner, *Tanaoptera* Billberg, *Debis* Doubleday, and *Zophoessa* Doubleday are all synonymic to *Lethe* as is adequately explained by Hemming, 1934.[1] Moore divided this group into numerous small genera. In 1880, in his Lepidoptera of Ceylon, vol. 1, p. 18, he erected the genus *Hampha.* In 1881, on page 305 of the Trans. Ent. Soc. Lond. he proposed the genus *Tansima.* In volume 2 of his "Lepidoptera Indica," he erected the following genera: *Rangbia, Nemitis, Dionana, Sinchula* and *Kerrata.* All of these genera are based on superficial characters and can be considered only as synonyms.

[1] The Generic Names of the Holarctic Butterflies, pp. 30–32, Oxford University Press.

Austin H. Clark, in the Proc. of the U. S. Nat. Mus., vol. 83, No. 2983, 1936, summarized the genus *Enodia* in North America, and described two new subspecies. His limiting of the name *portlandia* to the southeastern sub-species, with *andromacha* Hübner and *androcardia* Hübner as synonyms, is perfectly valid and adequately detailed in his paper. His recognition of *creola* as a distinct species also agrees with my findings, for the two species have an overlapping distribution in Virginia and North Carolina, with no apparent interbreeding; and differ in their flight behavior. The genitalia of *portlandia* have more blunt terminations to the valves than are found in *creola* although extremely similar in all other respects. The distinctive androconial patches found on the forewings of the male *creola* are also diagnostic for that species, though they may vary in their development.

Doctor Clark also described two subspecies of *portlandia* in his paper, one from Sullivan County, New York which he called *anthedon*, the other from Ontario which he named *borealis*. Both of these are distinguished from typical *portlandia* by the absence of white on the lower surfaces, the row of ocelli on the underside of the forewings being straight, and the ocelli on the underside of the secondaries having circular instead of elongate pupils. His principal distinction between *anthedon* and *borealis* is based on the breadth of the dark band between the light line bordering the fourth and fifth spots and the submarginal light band below. In long series from Pennsylvania, New York, Illinois, Ontario, Manitoba and smaller series from Quebec, West Virginia, Ohio, Maine, Minnesota and Missouri, examples matching both of his subspecies are sufficiently abundant so that neither one is overwhelmingly the dominant form. Consequently, using page priority, the author selects the name *anthedon* to apply to the northern subspecies. Although the name *borealis* could be used to designate a slight form, it is preferable to sink the name into synonymy.

Linnaeus-Johanssen described *Papilio eurydice* in 1763 in Amoenites Academicae, vol. 6, p. 406, this name preceding *canthus* Linnaeus and others. In 1840, Gosse in the Canadian

Naturalist, p. 247, described *transmontana* from Compton, Quebec. This name has been used to distinguish northern specimens of *eurydice* as a subspecies, but after studying long series from throughout the range of distribution of the species, no constant character can be found to distinguish the populations. The relative pale color usually used as a diagnostic feature of *transmontana* does not always occur in the more northern specimens, and occurs far too frequently in the more southern examples. For this reason, I sink it into synonymy. F. H. Chermock, in 1927, described an aberration of this species from Port Hope, Ontario, characterized by the absence of spots on the upper side of the primaries. Field, in 1936, described a "form" of this species from Bloomfield, Michigan, having a very pale color, almost albinic in character. Feeling that there is no need for names below the subspecific level which are used to designate the extremes of the normal range of variation of any given population, I sink these into synonymy.

Leussler, in vol. 27, p. 99 of the ENTOMOLOGICAL NEWS for 1916, described a race of *eurydice* from a small bog in Sarpy County, Nebraska, a few miles south of Omaha. It was characterized by its darker color, larger size and larger markings on the upperside of the wings. In all other respects it was the same as typical *eurydice*. Apparently, this insect was restricted to a very small area, and has since become extinct. In examining cotypes and topotypes of *fumosus,* the author finds that actually the specimens described occurred only as a form of the typical species in the type locality along with the normal form.

The variation of *Lethe eurydice* is extremely interesting. They usually are restricted to swampy or boggy areas where their foodplant occurs, and because of their relatively weak flight habits, rarely leave these areas. Consequently, two bogs, which may be only a mile apart, will have little or no interchange of populations of this species. This affords perfect conditions for microevolution, and frequently light forms may develop in one bog, while in a nearby swampy area, darker colored forms may predominate. This variation may be duplicated in numerous local populations over a fairly large area, each of which has its own

distinctive characteristics. Essentially, however, they represent local isolations of a potentially variable species. As such, the author feels that these local isolated populations are deserving of no subspecific designation. *Fumosus* is an example of a restricted population of this type, and consequently the author feels that it should be considered as a synonym of *eurydice*.

On the other hand, if the local populations of an area covering thousands of square miles collectively possess diagnostic characters which separate them from relatives inhabiting an adjacent large geographical area, we have true subspecies developed. In the zone where the ranges overlap, we may of course find an overlapping of the diagnostic features of both, or may find neighboring isolated populations of one or the other subspecies. However, considering the overall geographic distribution, the author feels that it is valid to use the term subspecies to designate the inhabitants of these large areas. For this reason, he proposes subspecific rank for members of the species *eurydice* inhabiting the southern Appalachians.

Lethe (Enodia) eurydice appalachia, new subspecies

Male. Length of primary (measured from the base of the wing to the apex) 23–27 mm., average length 25.5 mm.; longer than in *eurydice eurydice*. Genitalia cannot be distinguished from the typical form. Upper Surface: ground color of a darker brown than that of the typical form, with very slight contrast between the limbal and discal areas of the primaries; the row of ocelli reduced in size and tend to be obscured by the general dark ground color of the primaries; there is no contrast between the limbal and discal areas of the secondaries, and the ocelli are larger than in the typical subspecies. The color, maculation and length of wing are comparable to that of *fumosus* Leussler. Lower surface: darker brown than in the typical form, homogeneous, with a slight purplish cast and lacking the yellow which occurs so frequently in *eurydice eurydice*. Ocelli large, filling the intravenous space, white pupilled, ringed with yellow, then a ring of the ground color, and finally a ring of light grayish-white as in the typical form. The most diagnostic feature is the

structure of the dark brown band between the discal and limbal areas; in typical *curydice* this band is strongly serrate on the primaries, in *Appalachia* it is consistently straight, very slightly curved, and slightly irregular between Cu_2 and A_2; on the secondaries this band is smoothly sinuate, having none of the sharp pointed irregularities usually found in the typical subspecies.

Female. Wing expanse 25 to 27 mm., average 25.5 mm.; exhibits all of the characteristics of the male but has more contrast between the limbal and discal areas of the upper surface.

Holotype: male, Conestee Falls, near Brevard, North Carolina, June 28, 1941 (R. Chermock). *Allotype:* female, Conestee Falls, N. C., June 27, 1941 (R. Chermock). *Paratypes:* R. L. Chermock Collection: 4 males, Terra Alta, West Virginia, July 2–3, 1939 (R. Chermock); 4 males, Conestee Falls, N. C., June 27–28, 1941 (R. Chermock). F. H. Chermock Collection: 1 male, Terra Alta, W. Va., July 2, 1939 (R. Chermock); 4 males, Conestee Falls, N. C., June 26 to July 8, 1937 (W. Sweadner); 1 male, Batesville, South Carolina, (F. H. Chermock). Don B. Stallings Collection: 1 male, Conestee Falls, N. C., June 29, 1941 (R. Chermock). American Museum of Natural History Collection: 1 male, Coosawhatchie, S. C., July 26, 1938 (R. B. Dominick); 2 males, Monticello, Florida, Oct. 4–8, 1914. U. S. National Museum Collection: 1 female labelled Washington, D. C., July 17, 1929 (figured on Plate 1, figures 3 and 4, Bulletin 157 of the U. S. National Museum, as being from Beltsville, Md.); 2 males, Washington, D. C., July 4, 1930 and July 29, 1929; 1 male, Beltsville, Maryland, July 15, 1928; 4 males and 1 female, Little Meadows, Giles Co., Virginia, July 25–26, 1940 (L. G. Carr); 1 female, Speedwell, Va., August 11, 1938 (A. H. Clark); 1 female, Glen Carlyn, Va., August 12 (A. N. Caudell); 1 female, Vienna, Va., July 19, 1936 (A. H. Clark); 1 male, Burkes Garden, Va., July 19, 1936; 1 female, Longs Gap, Grayson Co., Va., August 11, 1938 (A. H. Clark).

This new subspecies ranges from the mountains of West Virginia, south through the Appalachian Mountains into Florida. Dr. Austin H. Clark, in correspondence, informs me that

he has collected specimens of *appalachia* in the mountains of southwestern Virginia. In addition, he mentions it occurring in the coastal swamps of eastern Virginia and South Carolina. Apparently, *appalachia* is not found on the Piedmont, except in the vicinity of Washington, D. C. One of these specimens is figured by Dr. Clark on plate 1, figs. 3–4 of his "Butterflies of the District of Columbia" collected in Beltsville, Md., and is unquestionably referable to the new subspecies.

In summarizing the above conclusions, the author presents the following checklist of the North American representatives of the genus *Lethe:*

Genus *Lethe* Hübner, 1818. Genotype: *Papilio europa* Fabricius, 1775.
Subgenus *Enodia* Hübner, 1818. Genotype: *Enodia andromacha* Hübner, 1818 (= *Papilio portlandia* Fabricius, 1781).
portlandia portlandia (Fabricius)
synonym *andromacha* (Hübner)
synonym *androcardia* (Hübner)
portlandia anthedon (Clark)
synonym *borealis* (Clark)
creola (Skinner)
eurydice eurydice (Linnaeus-Johanssen)
synonym *canthus* (Linnaeus)
synonym *cantheus* (Godart)
synonym *transmontana* (Gosse)
synonym *boisduvalii* (Harris)
synonym as aberration *boweri* (F. H. Chermock)
synonym as aberration *rawsoni* (Field)
synonym as field form *fumosus* (Leussler)
eurydice appalachia R. L. Chermock

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